

**TITLE: ROTARY INDEXING DISPENSER**

**[001]** This invention relates to the technology disclosed in patent publication CA. 2,430,936, (June 10th 2003, Allen), and claims the benefit of priority of UK Patent # GB2443034, (Jan. 2011 Allen). The indexing pill dispenser, there disclosed performs holding, transporting, and dispensing functions, and possesses numerous benefits and advantages over known rotary indexing pill dispensers.

**[002]** The present invention aims to simplify some features, which diminishes some assembly labour requirements associated with cost, to be user friendly, especially to users with limited fine motor ability, and amputees, one can actually reload and dispense the contents by the use of one hand only. The present invention aims to provide a rotary indexing dispenser, which successfully integrates simple components. The new dispenser is aimed at being simple to activate, using only one hand. Preferred features include reservoir that allows extra supplies to be stored, and stacked in advance, and safety features which make inadvertent operation unlikely.

**[003]** The designs as depicted herein are aimed at describing the beneficial aspects suitable for containing and dispensing pills and similar products; easy and not confusing to access, and does not compromise its safety features.

**[004]** The invention will now be describe by way of example, with reference to the accompanying drawings, in which:

**FIG.1** is a pictorial view of the underside of a lid or cover of a pill dispenser;

**FIG. 2** is a pictorial view of the underside of a base component of the dispenser;

**FIG. 3** is a view of the topside of the base, showing its multiple compartments;

**FIG. 4** is a pictorial view of supply reservoir of the dispenser;

**FIG. 5** is a pictorial view of a conical spring component of the dispenser;

**FIG. 6** is a pictorial partly exploded view of some of the component of the dispenser;

**FIG. 7a is a diagrammatic plan view showing the cover of a dispenser assembled to the base;**

**FIG. 7b is the same view as FIG. 7a but with the cover relatively rotated;**

**FIG. 7c is the same view as FIG. 7a but with the cover rotated further;**

**FIG. 8a is a diagrammatic side view, showing some of the cylindrical parts of the cover and base as if unrolled;**

**FIG. 8b is the same view as FIG. 8a but with the cover relatively rotated;**

**FIG. 8c is the same view as FIG. 8a but with the cover rotated further;**

**FIG. 9 is a sectioned side elevation of the dispenser;**

**FIG. 10 is the same view as FIG. 9 of another dispenser;**

**FIG. 11. (which appears with FIG. 5.) is an exploded pictorial view of the dispenser of FIG. 9**

**[005] The dispenser 30 includes a cover 32, which is formed with a dispensing porthole 34, and with an associated primary indexing tab A. An arrow 36 on the cover 32 identifies the primary tab A. A base 38 of the dispenser 30 is formed with twenty-eight containing compartments 40. To dispense its contents, the user aligns the arrow 36 with the particular day and time of the dose. This results in the dispensing porthole 34 being aligned with the compartment for the day and time. To dispense the contents, the user tips the dispenser 30 upside down, whereupon the pills fall out of the aligned compartments.**

**[006] In the example shown, the designer has provided twenty-eight compartments, corresponding to four pill doses per day, for one week. (The designer may alternatively provide other configuration. The minimum number of compartments, for the invention to be applicable as a pill dispenser, would be seven.) The day and time of each dose is labelled on the outside of each respective compartments. The same information is provided in Braille. To replenish the compartments 40, the cover 32 is removed from the base 38 whereupon the compartments 40 now all lie exposed, and further pills can**

be added by the user are caregiver. The base and the cover may be moulded in a transparent plastic material for better visibility.

[007] FIG. 7a is a plan view of (part of) the base 38 and cover 32 of another pill dispenser. The base 38 is formed with a series of sockets, which are defined by projections 43 on the shelf 45 of the base. In this case, there are twenty-nine sockets, pitched in a circle centered on the axis of the rotation 50 of the cover 32. The twenty-nine sockets correspond to orientations of the cover 32, in which the porthole 34 in the cover overlies respective ones of the twenty-eight compartments 40 in the base 38, plus one remove-cover orientation, at which the cover can be removed from the base.

[008] Some of the sockets between the projections 43 termed open-sockets, are wider than the other sockets. The six sockets at numbered locations 1,7,12,19,22,28 are the open-sockets. The sockets in the remaining numbered locations are termed the tight sockets. FIG. 7a shows the cover 32 in its remove cover orientation, and it can be seen that the designer has arranged for the six tabs A,B,C,D,E,F on the ledge 47 of the cover 32 to be aligned with the six open sockets, at this orientation of the cover. Thus, in the remove-cover orientation of the cover, the ledge 47 of the cover is now not constrained underneath the shelf 45 of the base, and the cover can now be lifted off.

[009] FIG. 7b shows the cover 32 having been rotated counter-clockwise one twenty-ninth of a complete revolution. Now, the tab A overlies the tight-socket at location 29. It will be noted that, in this orientation, all six of the tabs overlay respective tight-sockets, i.e. none of the tabs now overlies one of the open-sockets. The tight-sockets are circumferentially narrower than the circumferential width of the tabs, whereby the tabs cannot pass through the tight-sockets, and the cover 32 cannot be removed from the base 38.

[0010] It will be understood that, with the cover 32 shown in the orientation of FIG. 7b, the cover is firmly held in place on the base 38. All six of the tabs are constrained by the tight-sockets, whereby the ledge 47 of the cover engages the shelf 45 of the base, and the cover is securely held onto the base.

[0011] FIG. 7c shows the cover 32 having been rotated further. Now the tab A overlies the open-socket at location 22. The tab B on the cover also overlies one of the open-sockets, being the one at

location 28. These tabs A,B, in FIG. 7c, orientation of the cover, therefore cannot contribute anything to the security with which the cover is guided and carried for rotation with respect to the base. In FIG. 7c, all the guiding constraint for the cover must therefore come from the other four tabs C,D,E,F which do overlie respective tight-sockets, as shown.

[0012] A polygon (being a quadrilateral, 49 in this case) has been drawn, by joining up the tabs that overlie tight-sockets. Attention is drawn to the fact that the axis 50 about which the cover rotates is located inside the perimeter of this polygon. With the axis being inside the polygon, the four tabs C,D,E,F that provide constraint for the cover are well spaced around the circumference of the ledge and shelf, providing good guiding stability.

[0013] Note that if there were to be a an orientation of the cover in which the axis 50 lay outside the perimeter of the polygon, it would mean that all the tabs contributing to the provision of guiding constraint for the cover would then all be on one side of the ledge and shelf. If such a configuration were allowed, therefore, the cover be liable to tipping, relative to the base. Even if the cover did not fall off, it might encounter misalignment problems and liable to jamming.

[0014] The designer should therefore see to it that, in everyone of the possible orientations of the cover, (other than the remove cover-orientation, of course), as many as possible, and never fewer than three, of the tabs overlie tight-sockets. The designer should also choose a configuration of tabs and sockets in which, in everyone of the possible orientations of the cover that corresponds to the porthole overlying one of the compartments, also that the configuration should be such that a triangle joining those three includes the axis 50 within its perimeter.

[0015] The configuration in FIG. 7a-7c is not the only one of which this condition is true, even for dispensers having twenty-eight compartments. The prudent designer will lay out a proposed configuration of tabs and sockets before committing to a final design of the dispenser, and will check (e.g by trial and error) that, of all the possible orientations of the cover in which the porthole overlies one of the compartments, there is none in which fewer than three tabs overlie tight-sockets. Theoretically, the functional requirements of the tabs and sockets configuration might be met with as few as three tabs (and the number of open-sockets must be at least equal to the number of tabs). The

larger the number of tabs and (open-sockets), the easier it will be for the designer to hit upon a configuration in which the functional requirements are not met in respect of all possible orientations. Of course, the functional requirements would not be met at all, if only two tabs or only one tab were provided; in that, then, no polygon at all could be drawn.

[0016] Each tight-socket designed between the projections 43 is so shaped as to block a tab positioned over that socket from passing through the socket. However, as illustrated in FIGs

8a-8c, the tab and the tight-socket are so shaped with respect to each other that the tight-socket does provide a measure of rotational restraint against the respective tab. A chamfer is

provided on one (or both) of the tab and the tight-socket, whereby, when the tab is biased in the direction axially towards the tight-socket, the tab is urged circumferentially rotationally

forwards a central position within the tight-socket. Thus, the design of the tabs and tight-sockets serves as an indexing detent apparatus.

[0017] The cover is biased away from the compartments in the base, by a spring 52. Thus the base 47 (of which the tabs are apart) and the shelf 45 (of which the sockets are apart) are urged together, by the spring 52. Consequently, the spring 52 provides the biasing force which urges the tabs into contact with the tight-sockets. Thus, if there is no contact with the cover, the cover will remain indexed in that particular orientation dictated by the particular tabs and tight-sockets that are in alignment.

[0018] To over-ride the indexed position, the user manually rotates the cover. This causes the tabs to ride up on the chamfer, whereby the cover moves axially away from the base at the same time as rotates relative to the base. Thus, the tab on ledge 47 of the cover 32 lift itself over the projection 43 and disengages itself from the tight-socket on shelf 45 of the base 38. The tab now rest on one of the projections 43 that define the sockets. (Other tabs rest on others of the projections, as shown in FIG.8b). Also shown in FIG.8c (and FIG. 7c), one (or more) of the tabs would not engage with one of the tight-socket if that tab was positioned over one of the open-sockets. Only one tab needs to engage with the

tight socket in order to perform the indexing function; however, as mentioned, the designer will see to it that at least three of the tabs do engage with corresponding with tight-sockets, for the other reasons as described.

[0019] The user can also disengage the tabs from the sockets, enabling the cover to be rotated by pressing the cover towards the base, against the spring.

[0020] The spring 52 is fitted within a hollow chamber 56 lying inside the annular portion of the base 38 in which the compartments 40 are formed. The spring rest against a shoulder 58 of the base, and maybe held in position with bumps moulded into the shoulder area. As shown in FIG. 5 the spring 52 is a conical disc spring. The spring is made of a flexible plastic material. The spring may include a central hole 60 and is formed with radial slits that define spokes 63 that provide the desired level of force urging the cover away from the body, and urging the tabs formed on the ledge into contact with the sockets formed on the shelf.

[0021] FIG. 4 shows an optional component of the dispenser. This comprises a reservoir 65, in which stacks of pills can be stored. The projections 43 are duplicated on a corresponding shelf of the reservoir 65. Thus, provided the tabs A,B,C,D,E,F of the cover 32 have also been duplicated on a duplicate ledge formed underneath the base 38 (as they have been in FIG. 3), the reservoir can, by hand manipulation, be attached to, and removed from, the under-surface of of the base 38, just as the cover 32 can, by hand manipulation, be attached to and removed from the upper surface of the base. It will be understood that the cover 32 can be assembled to the reservoir 65, as it can to the base 38.

[0022] FIG. 10 shows that the ledge and shelf arrangement of the cover and base can be reversed. The FIG. 9 version is preferred, in that in FIG. 9 a rim of the cover lies outside the base, making the cover easier to grasp and manipulate.

[0023] Housed also in the chamber 56 is a timer and annunciator module 70. This is an electronic device, powered by a contained battery. The module 70 includes two manual controlling knobs 72, which protrude through the hole 60 in the spring 52 and in the cover 32.

**This arrangement is very convenient as far as operability is concerned; also, the module is tucked away in a place where space is available, which would otherwise be wasted.**

**[0024] The operation and function of the timer/annunciator module are generally as follows; USER CONTROL INPUTS A,B,C > TIMER AND ANNUNCIATOR CONTROL SYSTEM> AURAL OR VISUAL ANNUNCIATOR.**